

PATENT SPECIFICATION

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(54) FILTER

(71) We, DOSCO OVERSEAS ENGINEERING LIMITED, a British Company, of Planar House, Walton Street, Aylesbury, Buckinghamshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to a suction filter, for filtering dirty oil or other fluid. It is an object of the present invention to provide a suction filter immersible in a bath of fluid to be filtered and which incorporates means for automatically shutting off the flow of fluid to be filtered through the filter at times when the filter element has to be changed.

20 According to the present invention, we provide a suction filter including an outer casing defining a filter chamber submersible in a bath of fluid to be filtered and having an inlet located in the casing wall to receive dirty fluid to be filtered from said bath and an outlet in the casing wall for discharging clean, filtered fluid, a cage for holding a filter element within the casing and movable between a first, filtering position and a second position in which the filter element can be changed, means to lock the cage in its first position, and wherein the cage, when in its second position, closes off the inlet and outlet to prevent passage of fluid.

25 Preferably the filter includes a cylindrical filter element.

30 Preferably the cage is arranged to be held in its second position by engaging a step on the casing.

35 Preferably the outer casing and cage are generally cylindrical, and the inlet and outlet are located in the cylindrical wall of the outer casing, and the cage is movable to its second position by a spring acting between the cage and casing after it has been rotated relative to the casing, after release of said locking means.

40 Preferably the cage is in three parts, one end part slidably receiving a housing adapted to support one end of the filter

element, which is also preferably generally cylindrical. Preferably the locking means acts between the housing and casing. 50

Preferably, the external diameter of a perforate part of the cage is less than the internal diameter of the casing to allow passage of fluid, and preferably, each end part of the cage is of enlarged diameter relative to the perforate part and fluid impermeable so that when in its second position, said enlarged diameter ends block off the inlet and outlet, thus preventing passage of fluid into and out of the filter and from the inlet to the outlet. 55

Preferably a rod extends internally of the length of the filter and is fixed to the cage, e.g. at an inner end, but is slidable relative to the casing, and passes through an aperture in the lower end of the casing and a transverse locking plunger is fixed to the housing, but is transversely slidable relative thereto when the cage is in its second position, said plunger when in its locking position locking the rod to the housing. 60

Preferably a pillar prevents transverse sliding of the locking plunger when the cage is in its first position. 65

Hence, when the plunger is in its second or unlocking position, the housing and filter element can be removed from the cage, with the latter preventing flow of fluid through the inlets and outlets. Preferably the upper and lower end locating parts or rings of the filter element can be removed, and a new filter element can then be fitted. 70

The present invention is now described, by way of example, with reference to the accompanying drawings, in which:— 75

FIGURE 1 is a longitudinal section of a suction filter on the line D—D of Figure 2;

FIGURE 2 is an end view;

FIGURE 3 is an inverted side view, and

FIGURE 4 is a section on the line B—B of Figure 2, but showing a cage of the filter in its raised position. 80

Referring to the drawings, the suction filter has an outer casing 1 for locating in a bath of fluid to be filtered. The casing 1 is generally cylindrical, and locatable in a pair 85

of spaced plates, 3, 5, by cap screws 7, a suitable gasket being provided at 6. The casing has four equi-spaced fluid (herein-after called oil) inlets 9 for dirty oil adjacent its lower end 11, and four similar clean-oil outlets 13 adjacent its outer end. A cylindrical cage 15 is slidably mounted in casing 1, the ends 17, 19 of the cage being imperforate and of enlarged diameter relative to the perforate portion 21, and forming sliding bearing surfaces for the cage. In the position shown in Figure 1 oil can be sucked through inlets 9, through portion 21 of the cage, then through a replaceable cylindrical filter element 23 located in annular grooves 25, 26 in annular rings 28, 30 adjacent the ends of casing 1. The ring 30 is screw threadedly connected to a housing 29 slidable within the casing 1, whereas the ring 28 rests within an annular recess 32 in cage end 19. The oil flows through the cage portion 21 and filter element 23, passes axially along the filter element 23 and then out through six apertures 27 in the housing 29, and out through outlets 13. The housing 29 forms a close liquid-tight, sliding fit in the upper end of casing 1, and has at its lower end a recess 31 to locate the ring 30 for the filter element 23, and hold it within the casing 1.

To remove the filter element 23, two bolts 33 holding a flange 35 of housing 29 to casing 1 are removed, thus allowing anti-clockwise rotation of housing 29 so that lugs 37 on casing 1 can pass through apertures 39 in flange 35. A spring 41 acting between end 11 of casing 1 and lower end 19 of cage 15 will now tend to push cage 15, filter element 23 and housing 29 out of casing, but this movement will be stopped when cage end 17 engages step 43 at the top end of the casing. A rod 45 is fixed to housing 29 by means of transverse locking plunger 47, and to cage end 19 by transverse pin 49, and slides in an aperture in end 11 of casing, and also locates spring 41. When cage 15 hits step 43, the ends 17 and 19 of cage 15 will block off inlets 9 and outlets 13, preventing passage of oil, as shown in Figure 4. When housing 29 is in this position, rod 45 and plunger 47 will move sufficiently so that the plunger 47 is clear of a retaining pillar 48 on casing 1 which normally restrains the plunger 47 against movement. To release the housing so that the filter element can be withdrawn, plunger 47 is depressed so that slot therein (shown in broken lines) moves transversely through an annular locking channel 51 in the end of rod 45 until large diameter portion 53 of the slot aligns with the rod, whereupon the enlarged end of the rod 45 can pass through portion 53, and the housing 29 and filter element can be completely lifted out of the casing 1, leaving the rod 45 therein. All this time, the

spring 41 will maintain ends 17 and 19 of cage over the oil inlets 9 and outlets 13 to prevent passage of oil.

Once the filter element has been withdrawn from the outer casing, it can be replaced by a new one and the whole filter can be re-assembled using a reverse procedure to that described above. If desired, end locating rings 28, 30 of the filter element can be used more than once, and just the element itself can be replaced.

It is envisaged that locking together of the various parts making up the filter could be achieved in many different ways. For example, the initial locking arrangement with the lugs 37, apertures 39 and bolts 33 could be replaced by a different system and the transverse locking plunger 47 and associated mechanism could also be replaced by more simple and hence cheaper locking means.

WHAT WE CLAIM IS:—

1. A suction filter including an outer casing defining a filter chamber submersible in a bath of fluid to be filtered and having an inlet located in the casing wall to receive dirty fluid to be filtered from said bath and an outlet in the casing wall for discharging clean, filtered fluid, a cage for holding a filter element within the casing and movable between a first, filtering position and a second position in which the filter element can be changed, means to lock the cage in its first position, and wherein the cage, when in its second position, closes off the inlet and outlet to prevent passage of fluid.
2. A filter as claimed in claim 1 including the filter element, which is generally cylindrical.
3. A filter as claimed in claim 1 or 2 wherein the cage is arranged to be held in its second position by engaging a step on the casing.
4. A filter as claimed in claim 1, 2 or 3 wherein the outer casing and cage are generally cylindrical and wherein the inlet and outlet are located in the cylindrical wall of the outer casing.
5. A filter as claimed in claim 4 wherein the cage is movable to its second position by a spring acting between the cage and casing, after it has been rotated relative to the casing, after release of said locking means.
6. A filter as claimed in any one of claims 1—5 wherein the cage is in three parts, one end part slidably receiving a housing adapted to support one end of the filter element.
7. A filter as claimed in claim 6 wherein the locking means acts between the housing and the casing.
8. A filter as claimed in claim 6 or 7 when dependent on claim 4 or 5 wherein the external diameter of a perforate part of the

5 cage is less than the internal diameter of the casing to allow passage of fluid and wherein each end part of the cage is of enlarged diameter relative to the perforate part and fluid impermeable so that when in its second position said end parts of enlarged diameter block off the inlet and outlet, thus preventing passage of fluid into and out of the filter, and from the inlet to the outlet. 25

10 9. A filter as claimed in any one of claims 6, 7 or 8 wherein a rod extends internally of the length of the filter and is fixed to the cage but is slidable relative to the casing, and passes through an aperture in the lower end of the casing and wherein a transverse locking plunger is fixed to the housing but is transversely slidable relative thereto when the cage is in its second position, said plunger when in its locking position locking the rod to the housing. 30

15 10. A filter as claimed in claim 9 wherein a pillar prevents transverse sliding of the

20 locking plunger when the cage is in its first position. 35

11. A filter as claimed in claim 9 or 10 when dependent on claim 2 wherein, when the plunger is in its unclocking position, the housing and filter element can be removed from the cage with the latter preventing flow of fluid through the inlet and outlet.

12. A filter as claimed in claim 11 wherein upper and lower end locating parts of the filter element can be removed so that a new filter element can be fitted.

13. A filter substantially as hereinbefore described with reference to and/or as illustrated in the accompanying drawings.

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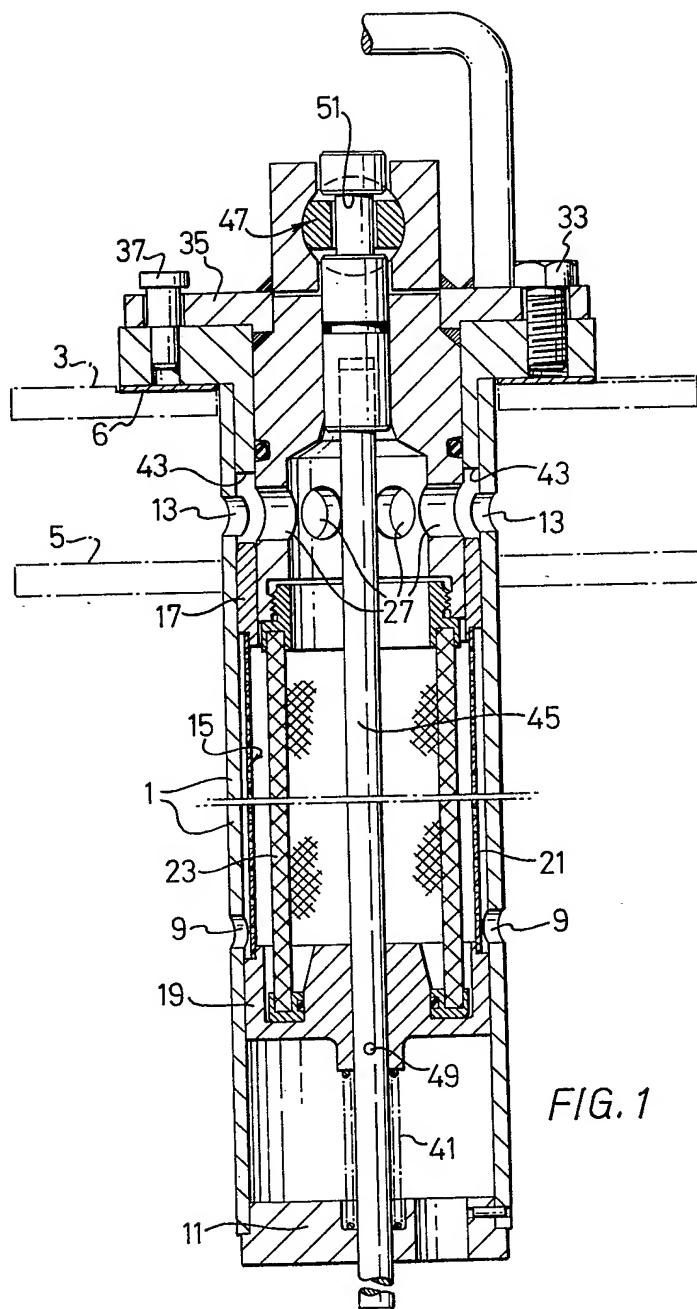
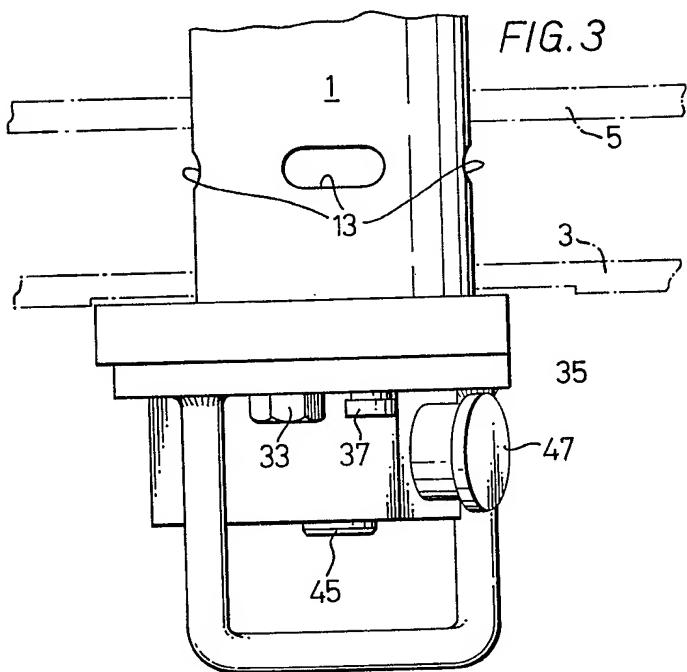
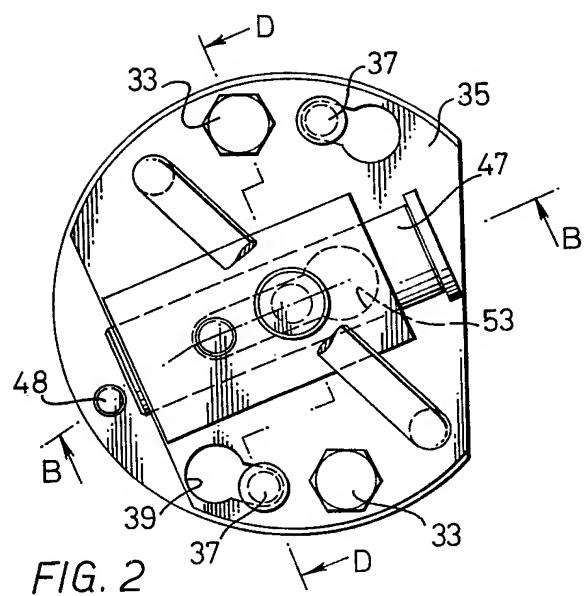


FIG. 1



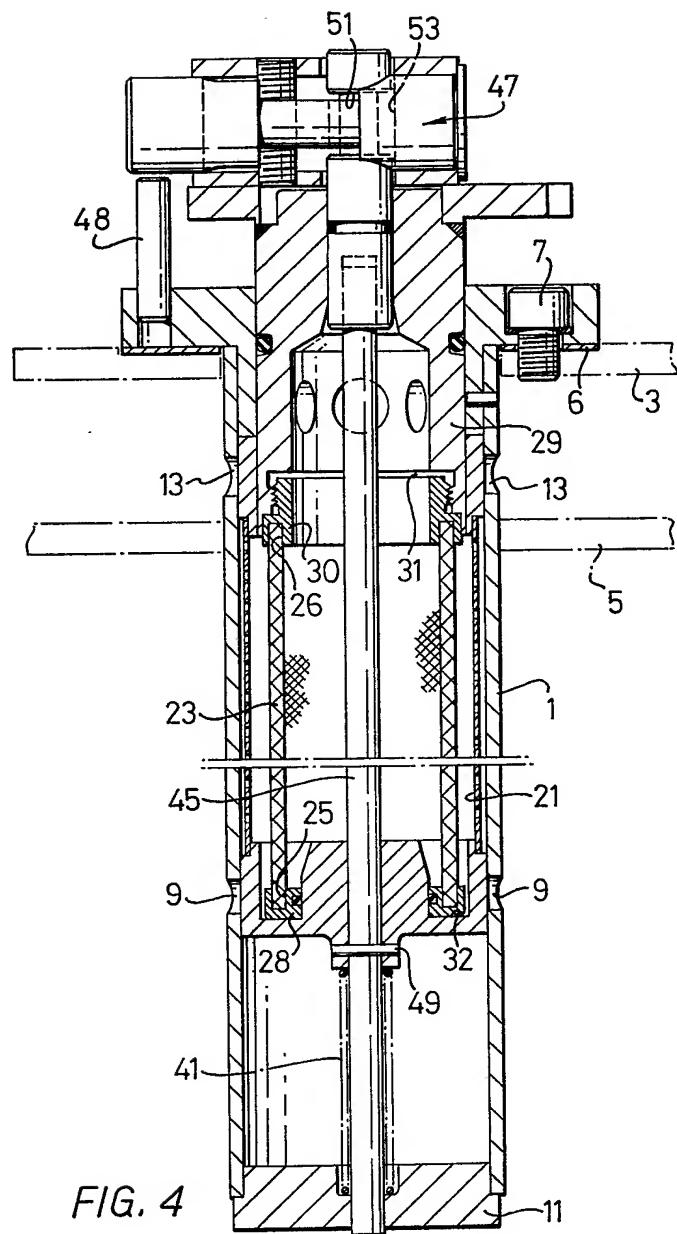


FIG. 4

DERWENT-ACC-NO: 1978-46262A

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TITLE: Suction filter for dirty oil in which fluid flow is automatically shut-off when filter element is changed

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BASIC-ABSTRACT:

Suction filter for fluids comprises a casing submersible in a bath of fluid to be filtered and having an inlet for entry of dirty fluid and an outlet for discharge of clean fluid. A cage for holding a filter element in the casing is movable between a first filtering position and a second position in which the filter element can be changed. The cage can be locked in its first position and in its second position closes the inlet and outlet to prevent flow of fluid.

Used for filtering dirty oil. Flow of fluid to be filtered is automatically shut off when the filter element needs changing.

TITLE-TERMS: SUCTION FILTER DIRT OIL FLUID FLOW
AUTOMATIC SHUT-OFF ELEMENT CHANGE

DERWENT-CLASS: J01

CPI-CODES: J01-F02D;